Claims

1. A power amplifier system using as an amplifying element a Schottky barrier gate metal semiconductor field effect transistor ("MESFET") with a source grounded for receiving a drain bias voltage and a forward gate bias voltage of zero or a low potential as supplied from a unipolar power supply and for amplifying an input signal superposed with said gate bias voltage to output an amplified signal indicative of a change in drain current, characterized in that

said MESFET permits, upon application of a forward direct current (DC) gate voltage to a gate terminal with a source terminal grounded, the DC gate voltage to be greater than or equal in value to 0.65 volt (V), said DC gate voltage causing a gate current value per gate width of 100 micrometers (μm) to go beyond 100 microamperes (μA).

2. The power amplifier system as recited in claim 1, characterized in that said MESFET is a MESFET of shallow depression type or enhancement type.

3. The power amplifier system, characterized in that said MESFET has a channel region comprised of a compound semiconductive material of direct transition type.

4. The power amplifier system as recited in any one of the preceding claims 1 to 3, characterized in that a circuit for supplying said gate bias voltage is equipped with a ripple filtering capacitor.

5. The power amplifier system as recited in claim 4, characterized in that said ripple filtering capacitor is provided outside of a semiconductor substrate with said MESFET formed thereon.

6. The power amplifier system as recited in any one of the preceding claims 1 to 5, characterized in that a layer made from an alloy of a metal constituting said gate electrode and semiconductor constituting said channel region is formed at an interface between the gate electrode and channel region of said MESFET.

7. The power amplifier system as recited in claim 6, characterized in that said metal is greater in work function than tungsten silicides.

8. The power amplifier system as recited in claim 7, characterized in that said metal is selected from the group consisting of platinum (Pt) and palladium (Pd).

9. The power amplifier system as recited in any one of the preceding claims 1 to 8, characterized in that said MESFET is formed separately per

semiconductor substrate and that said MESFET and a passive element are arranged in a way independent of each other.

10. The power amplifier system as recited in any one of the preceding claims 1 to 8, characterized in that said MESFET and a passive element for use in making up amplifier circuitry are formed on a single semiconductor substrate.

11. The power amplifier system as recited in any one of the preceding claims 1 to 8, characterized in that said MESFET and a passive element for use in making up amplifier circuitry plus output matching circuitry of said amplification circuitry are formed together on a single semiconductor substrate.

12. A mobile communications terminal device having a power amplifier circuit including a compound semiconductor MESFET for use as an active element for amplifying and outputting a high frequency signal, the MESFET having a source coupled to ground, a unipolar power supply for supplying said compound semiconductor MESFET with a drain bias voltage and a gate bias voltage, and an output matching circuit of said power amplifier circuit, characterized in that

said compound semiconductor MESFET permits, upon application of a forward direct current (DC) gate

voltage to a gate terminal with its source terminal grounded, the DC gate voltage to be greater than or equal in value to 0.65 volt (V), said DC gate voltage causing a gate current value per gate width of 100 micrometers (μm) to go beyond 100 microamperes (μA).

13. The mobile communications terminal device as recited in claim 12, characterized in that a circuit for supplying said gate bias voltage is associated with a ripple filter capacitor as connected thereto and provided outside of a semiconductor substrate with said MESFET formed thereon.

14. The mobile communications terminal device as recited in claim 12 or 13, characterized in that said compound semiconductor MESFET has a gate electrode and a channel region made of compound semiconductor defining therebetween an interface with a layer made from an alloy of a metal and said compound semiconductor formed thereat, said metal being selected from the group consisting of platinum (Pt) and palladium (Pd).